

Low drop power Schottky rectifier

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Low thermal resistance
- High avalanche capability specified

Description

Dual center tap Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters.

Packaged in PowerFLAT™, this device is intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection applications.

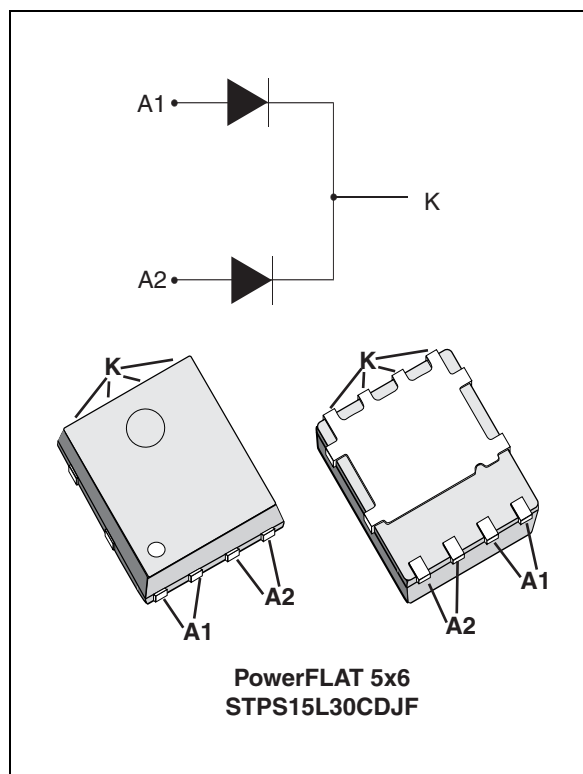


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 7.5 A
V_{RRM}	30 V
T_j (max)	150 °C
V_F (typ)	0.34 V

TM: PowerFLAT is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			30	V
I _{F(RMS)}	Forward rms current			10	A
I _{F(AV)}	Average forward current δ = 0.5	T _c = 140 °C	Per diode	7.5	A
			Per device	15	
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal		75	A
I _{RRM}	Peak repetitive reverse current	t _p = 2 μs square F= 1 kHz		1	A
P _{ARM}	Repetitive peak avalanche power	t _p = 1 μs T _j = 25 °C		2800	W
T _{stg}	Storage temperature range			-65 to + 175	°C
T _j	Maximum operating junction temperature ⁽¹⁾			150	°C

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	2.5	$^{\circ}\text{C/W}$
		Total	1.6	
$R_{th(c)}$	Coupling		0.7	

When diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode } 1) = P(\text{diode } 1) \times R_{th(j-c)}(\text{per diode}) + P(\text{diode } 2) \times R_{th(c)}$$

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$	-	-	1	mA
		$T_j = 125\text{ }^{\circ}\text{C}$		-	70	140	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 7.5\text{ A}$	-	-	0.48	V
		$T_j = 125\text{ }^{\circ}\text{C}$	$I_F = 7.5\text{ A}$	-	0.34	0.39	
		$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 15\text{ A}$	-	-	0.57	
		$T_j = 125\text{ }^{\circ}\text{C}$	$I_F = 15\text{ A}$	-	0.44	0.51	

1. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.27 \times I_{F(AV)} + 0.016 I_F^2(RMS)$$

Figure 1. Average forward power dissipation versus average forward current (per diode)

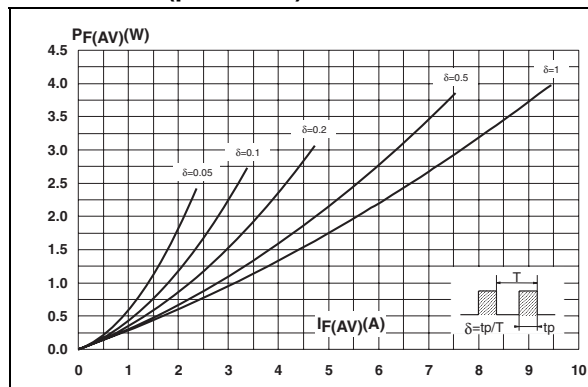


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

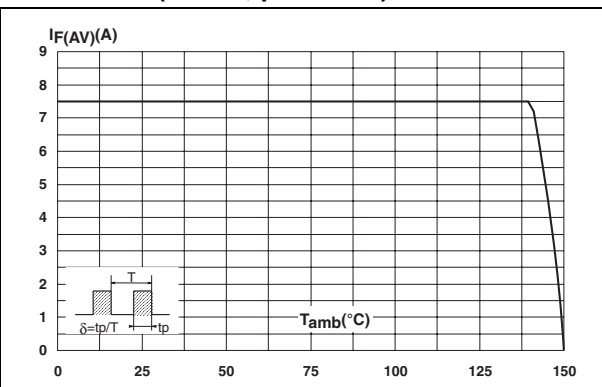


Figure 3. Normalized avalanche power derating versus pulse duration

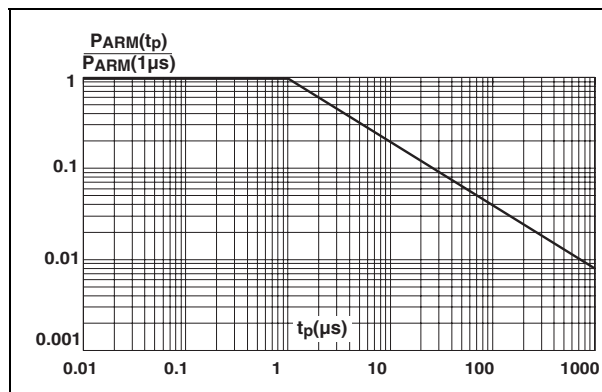


Figure 4. Normalized avalanche power derating versus junction temperature

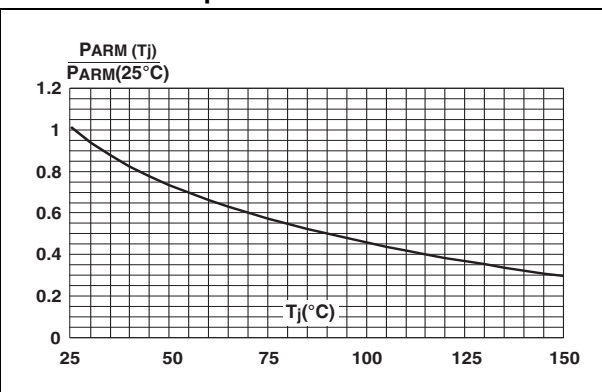


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

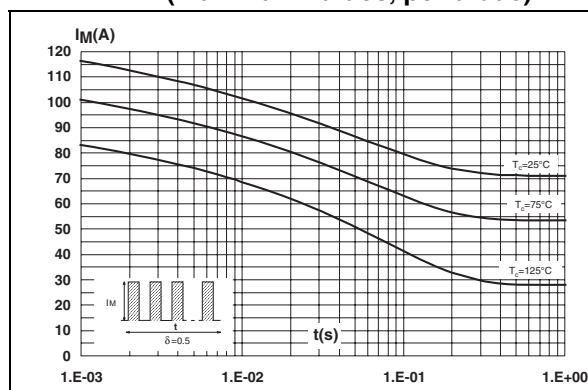


Figure 6. Relative variation of thermal impedance, junction to case, versus pulse duration

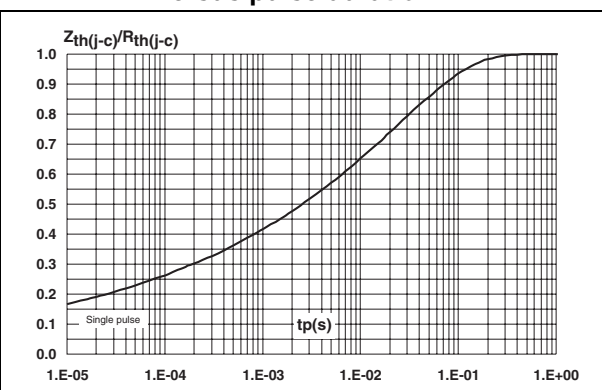


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

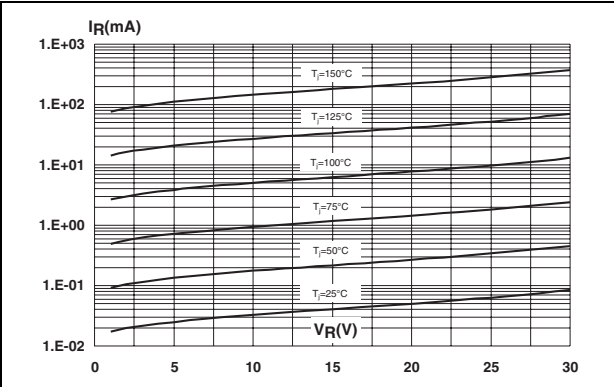


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

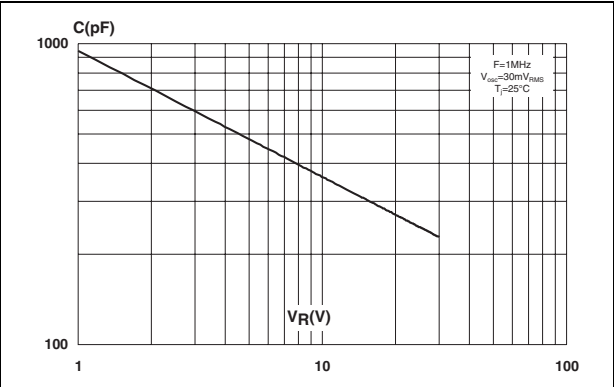


Figure 9. Forward voltage drop versus forward current (per diode)

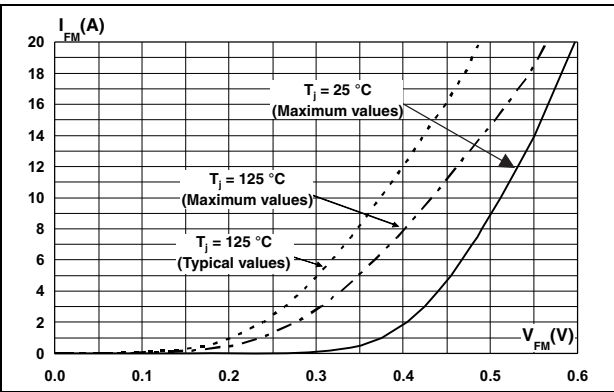
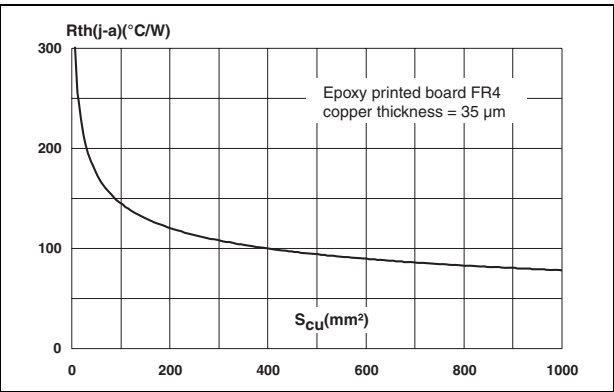


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead



2 Package information

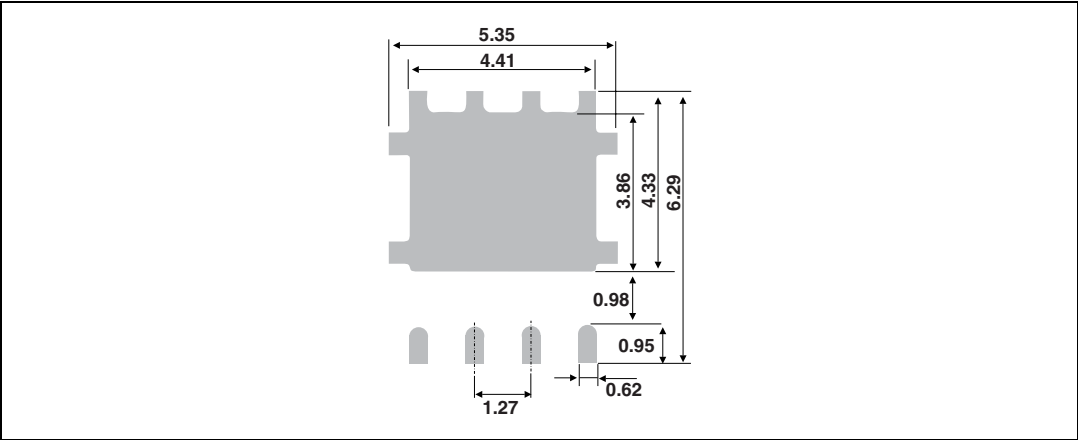
- Epoxy meets UL94,V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 5. PowerFLAT 5x6 dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.00	0.031		0.039
A1	0.02		0.05	0.001		0.002
A2		0.25			0.010	
b	0.30		0.50	0.012		0.020
D		5.20			0.205	
D2	4.11		4.31	0.162		0.170
e		1.27			0.050	
E		6.15			0.242	
E2	3.50		3.70	0.138		0.146
L	0.50		0.80	0.020		0.031
K	1.275		1.575	0.050		0.062

Figure 11. Footprint (dimensions in mm)



Dot identifying Pin A1 location

Dimensions:

- 0.30
- 1.20
- 5.30
- 12.0
- 2.0
- 4.0
- Ø 1.55
- 0.20
- Ø 1.5
- R 0.50
- 6.30
- 8.0
- 1.75
- 5.5

All dimensions are typical values in mm

User direction of unreeling →

4 Revision history

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS15L30CDJFTR	PS15 L30C	PowerFLAT 5x6	0.095 g	3000	Tape and reel

Date	Revision	Changes
13-May-2009	1	First issue.
09-Nov-2009	2	Updated Table 1 .
30-Jul-2010	3	Replace Power QFN with PowerFLAT. Updated Figure 9 .
18-May-2011	4	Added reference E in Table 5 . Updated package graphics. Removed dash from order code and updated marking in Table 6 . Added Figure 12 .

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